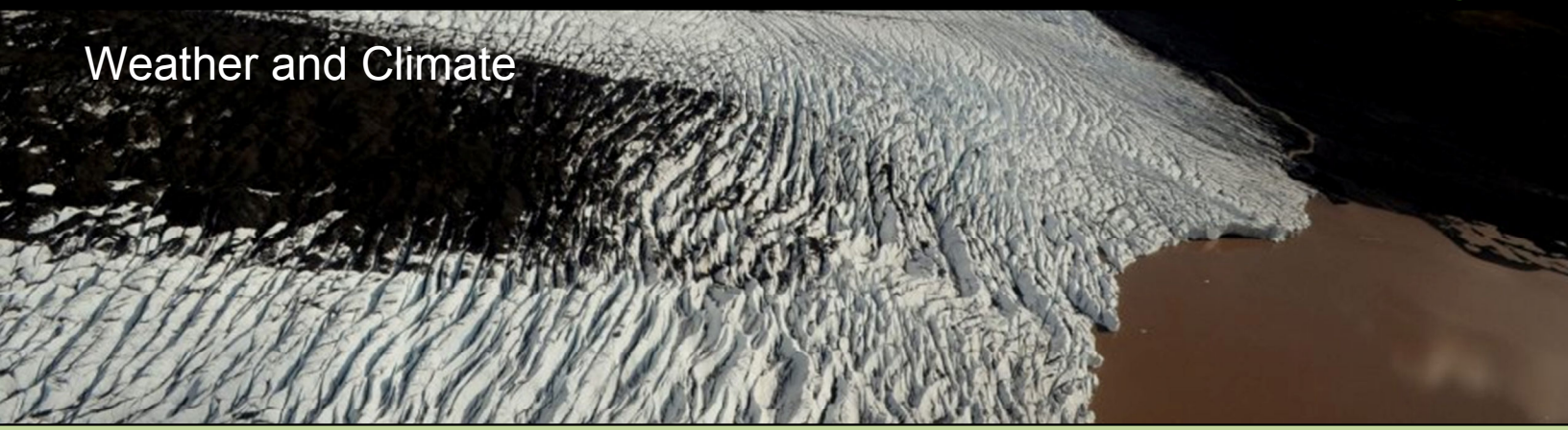
Central Alaska Network
Inventory and Monitoring Program

National Park Service
U.S. Department of the Interior



Weather and Climate

Wrangell – St. Elias Winter 2012-2013 Weather Summary

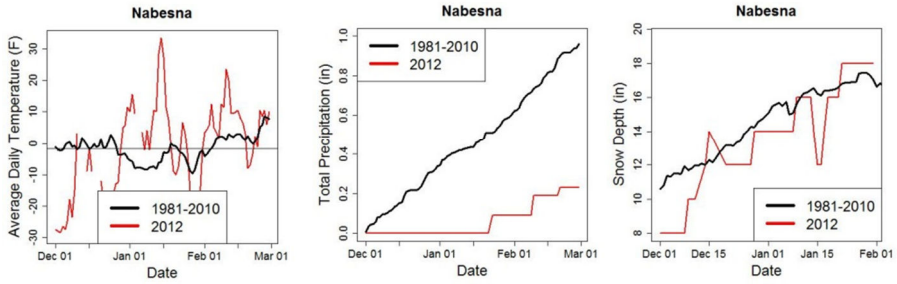
What is Normal?

"Normals" are used to place recent climate conditions into historical context. It takes 30 years of continuous weather data at one location to calculate what makes temperatures or precipitation amounts "normal". The latest normal period is 1981-2010.

There are three weather stations in & around the park that have records dating back long enough to calculate normals - Nabesna, Gulkana, and Yakutat. These sites provide valuable long-term records for the park and are good index sites to use for climate comparisons.

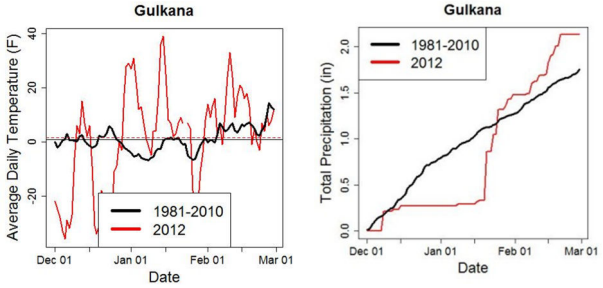
In Nabesna, winter 2012-2013 (December – February) started out much colder than normal. The average temperature in December was -14.5 °F, 13.6 degrees colder than normal. There were many missing values for precipitation so the monthly total was not calculated. The temperatures were warmer in February; the average for the month was 1.3 °F; normal is -4.7 °F. The snow depth at the end of the month was 18 inches, which is about average despite lower than normal precipitation (water equivalent). February temperatures remained warmer than normal. The average for the month was 6.7 °F compared to a 1981-2010 normal of 3.4 °F. Precipitation was only 25% of normal for February with 5.5 inches of snowfall recorded.

Nabesna Temperature, Precipitation and Snow Depth (red) compared to Normal (black)



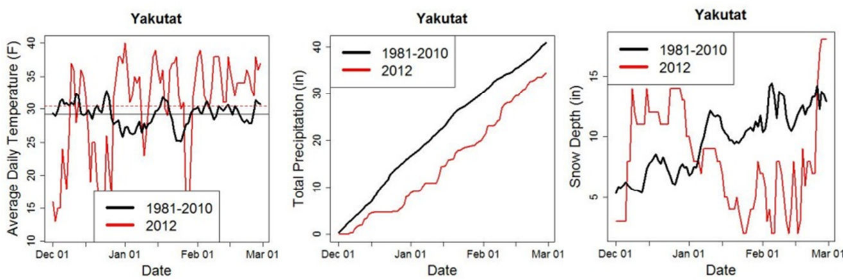
In Gulkana, December was cold and dry. The average temperature was -12.5° F, almost 13° F below normal. Precipitation was only 35% of normal. The temperatures warmed substantially in January with an average monthly temperature of 6.9° F, 9.8 °F warmer than the 1981-2010 normal. January was also wet. The total precipitation for the month was 1.21 inches, normal is 0.46 inches. The average temperature for February remained above normal with just a bit more precipitation than normal. The average temperature for the month was 11° F, 5.5 °F above normal. The total precipitation was 0.65 inches, slightly wetter than the normal 0.51 inches. Unfortunately, snowfall has not been measured at Gulkana since 1999.

Gulkana Temperature and Precipitation (red) compared to Normal (black).



And along the southern coast…..in Yakutat, December was cold and dry. The monthly average temperature was 25.0 °F, normal is 29.6 °F. The total precipitation for the month was 8.26 inches, about half of the normal 16.28 inches. Due to the cold temperatures, snow was deeper than normal for most of the month. More than 10 inches of snow was on the ground from December 8-31. January was 3.4 °F warmer than normal and received 81% of normal precipitation. Snow depth decreased gradually through the month with temperatures near freezing and below average precipitation. February was warmer and wetter than normal. The average temperature was 34.6 °F, 4.9 degrees warmer than normal. The February precipitation total was 14.89 inches, compared to a normal total of 10.86 inches. A snow event towards the end of the month brought snow depths up to 18 inches by the end of the month, the deepest recorded depth of the year.

Yakutat Temperature, Precipitation, and Snow Depth (red) compared to Normal (black).



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<u>Nabesna Weather Records</u>:

Climate Normal Period 1981 – 2010; Climate Record Period 1967 – 2013

Temperature

Nabesna Winter 2012 - 2013	Average Monthly Temp °F	1981-2010 Normal °F	Departure from Normal °F	Monthly High °F / Date	Monthly Low °F / Date
December	-14.5	-0.9	-13.6	16 / Dec 31	-32 / Dec 2, 5, 6
January	1.3	-4.7	+6.0	39 / Jan 13, 14, 15	-36 / Jan 28
February	6.7	3.4	+3.3	35 / Feb 10	-15 / Feb 20

Winter Season Temperature Departure from Normal: -1.4 °F

Precipitation

Nabesna Winter 2012 - 2013	Total Monthly Precip. in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 – hr. total in. / Date	Total Monthly Snowfall	Snow Depth at end of month in.
December	*	0.50	-	*	*	14
January	0.09*	0.56	-0.47	0.05* / Jan 23	4.0	18
February	0.14	0.55	-0.41	0.10 / Feb 9	5.5	M

* There were many missing values for precipitation in December and January, these values may be low.

Winter Season Departure from Normal: not calculated
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Wrangell – St. Elias Winter 2012-2013 Weather Summary

Gulkana Weather Records:

Climate Normal Period 1981 – 2010; Climate Record Period 1949 – 2013

Temperature

Gulkana Winter 2012-13	Average Monthly Temp °F	1981-2010 Normal °F	Departure from Normal °F	Monthly High °F / Date	Monthly Low °F / Date
December	-12.5	0.4	-12.9	37 / Dec 30	-44 / Dec 5
January	6.9	-2.9	+9.8	41 / Jan 14	-43 / Jan 27
February	11.0	5.5	+5.5	37 / Feb 10	-16 / Feb 22

Winter Season Temperature Departure from Normal: +0.8°F

Precipitation

Gulkana Winter 2012-13	Total Monthly Precip. in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 –hr. total in. / Date	# Days with >=0.01 in. water
December	0.27	0.78	-0.51	0.21 / Dec 8	3
January	1.21	0.46	+0.75	0.53 / Jan 20	9
February	0.65	0.51	+0.14	0.19 / Feb 15-16	11

Winter Season Departure from Normal: +0.38 inches

Yakutat Weather Records:

Climate Normal Period 1981 – 2010; Climate Record Period 1949 – 2013

Temperature

Yakutat Winter 2012-13	Average Monthly Temp °F	1981-2010 Normal °F	Departure from Normal °F	Monthly High °F / Date	Monthly Low °F / Date
December	25.0	29.6	-4.6	41 / Dec 9	2 / Dec 22
January	31.5	28.1	+3.4	42 / Jan 14	28 / Jan 28
February	34.6	29.7	+4.9	43 / Feb 9	5 / Feb 5

Winter Season Temperature Departure from Normal: +1.2°F

Precipitation

Yakutat Winter 2012-13	Total Monthly Precip. in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 –hr. total in. / Date	# Days with >=0.01 in. rain or snow
December	8.26	16.28	-8.02	2.00 / Dec 30	17
January	11.08	13.66	-2.58	2.40 / Jan 14	25
February	14.89	10.86	+4.03	2.58 / Feb 9	26

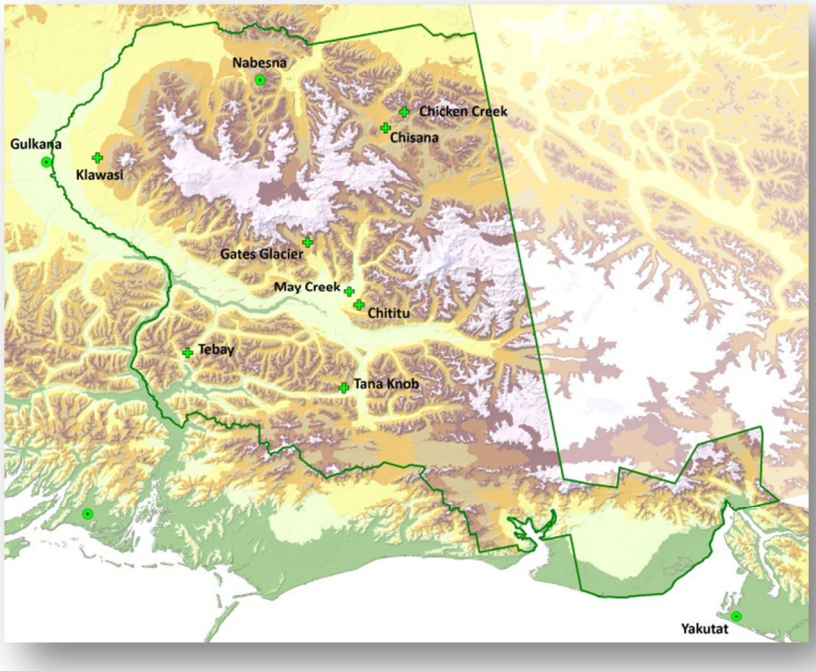
Winter Season Departure from Normal: -7.18 inches

Snowfall

Yakutat Winter 2012-13	Total Monthly Snowfall in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 – hr. snowfall total in. / Date	Snow Depth End of Month In.
December	27.3	23.2	+4.1	7.0 / Dec 8	10
January	17.3	31.9	-14.6	5.2 / Jan 29	7
February	45.2	28.6	+16.6	9.9 / Feb 17	18

Wrangell – St. Elias Winter 2012-2013 Weather Summary

As part of the climate monitoring vital sign, additional NPS climate stations were installed in the park to complement the long-term records at Nabesna, Gulkana, and Yakutat. These additional sites provide critical data on a park-wide scale that help characterize the climate gradients and patterns affecting resources in Wrangell-St. Elias National Park and Preserve.



Wrangell – St. Elias Remote Automated Weather Station (RAWS) summary – Winter 2012-13:

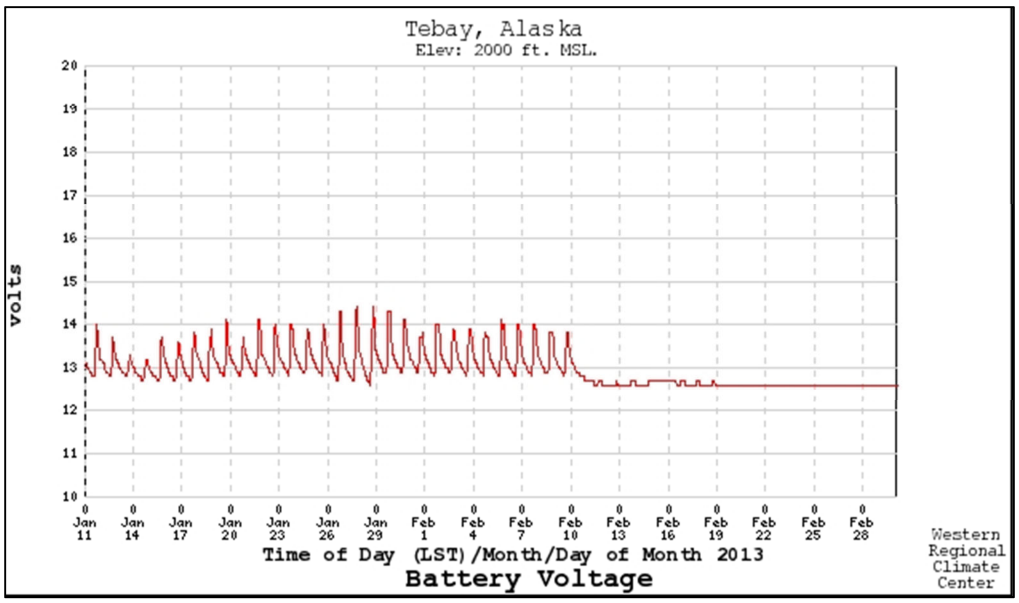
Site	Elev. Ft.	Average Temp °F Dec	Jan	Feb	Winter Avg. Temp °F	Extremes °F High	Low	Snow Depth In. *	Peak Wind mph	High T – Low T °F **
Chicken Creek	5240	2.3	11.6	15.2	9.7	40	-36	10	28	76
Chisana	3318	-18.9	-3.4	2	-6.8	37	-53	16	19	90
Gates Glacier	4060	8.9	19.2	21.2	16.4	37	-29	64	32	66
May Creek	1600	-12.9	9.4	14.8	3.8	44	-44	23	28	88
Tana Knob	3450	5.3	19.5	22.3	15.7	39	-26	40	43	65
Tebay	2000	-0.2	14	18.2	10.7	38	-26	46	13	64

* Snow depth on Feb. 28th; ** Difference between the high and low temperature for the season
Klawasi and Chititu sites are currently not transmitting real-time data and therefore are not summarized.

Interesting notes from RAWS stations:

- Temperature inversions are apparent in January when the higher elevation sites average ~13 degrees F warmer than the river valley sites.
- At the river valley sites the difference between the low temperature and the high temperature for the winter season averaged ~90 degrees F, while the difference in the mountain sites averaged ~ 67 degrees F.
- Normally January is the coldest month, but it was the warmest month this winter season (December-February) for all WRST RAWS stations.
- At Tebay (see graph and photo below) and Gates Glacier sites, the solar panel that recharges the batteries which powers the stations becomes buried by snow in February. There is plenty of stored battery power to keep the stations running until snowmelt, but the pattern change in daily battery voltages is obvious in the graph.

Wrangell – St. Elias Winter 2012-2013 Weather Summary



Time-series graph of Battery Voltage at Tebay RAWS.

Tebay Climate Station

Please Note: The summarized data are preliminary and have not undergone final quality control. Therefore, these data are subject to revision.

Connecting Further

New paper published – The First Decade of the New Century: A Cooling Trend for Most of Alaska

Central Alaska Network climate monitoring vital sign

Access near real-time data from Western Regional Climate Center and MesoWest

Check out the 3 month weather outlook from the NOAA Climate Prediction Center

Statewide summary of weather highlights in the latest Climate Dispatch from the Alaska Center for Climate Assessment and Policy

Map of projected temperature and precipitation changes Wrangell - St. Elias National Park and Preserve.

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